WHAT IS CLAIMED IS:

1.  A background replacing apparatus comprising:

an image obtaining section that obtains a
plurality of photographic images generated through
photography of a common subject under a plurality of
photographic conditions;

an area discriminating section that discriminates
among a subject area, a background area, and a boundary
area of the photographic image in accordance with at least
one of the photographic images obtained by the image
obtaining section;

a mixing ratio determining section that determines
a mixing ratio of a subject color to a background color in
the boundary area; and

a background replacing section that replaces a
background of the photographic image obtained by the image
obtaining section with a different background in accordance
with three areas of the subject area, the background area,
and the boundary area, which are discriminated by the area
discriminating section, and the mixing ratio determined by
the mixing ratio determining section.

2.  A background replacing apparatus according to
claim 1, wherein the area discriminating section
discriminates among the subject area, the background area,
and the boundary area of the photographic image in

accordance with a predetermined different point between the subject and the background in the photographic conditions.

3. A background replacing apparatus according to claim 1, wherein the area discriminating section discriminates the photographic image between a subject-side area and a background-side area in accordance with a predetermined different point between the subject and the background in the photographic conditions, and at least one of the subject-side area and the background-side area is reduced so as to be treated as the subject area and the background area, and an area between the subject area and the background area is treated as the boundary area.

4. A background replacing apparatus according to claim 1, wherein the area discriminating section discriminates the photographic image between a subject-side area and a background-side area in accordance with a predetermined different point between the subject and the background in the photographic conditions, and the subject-side area is reduced so as to be treated as the subject area, and an area portion excepting the subject area, of the subject-side area before reduction, is treated as whole or part of the boundary area.

5. A background replacing apparatus according to claim 1, wherein the area discriminating section

discriminates the photographic image between a subject-side area and a background-side area in accordance with a predetermined different point between the subject and the background in the photographic conditions, and the

5      background-side area is reduced so as to be treated as the background area, and an area portion excepting the background area, of the background-side area before reduction, is treated as whole or part of the boundary area.

10         6.   A background replacing apparatus according to claim 1, wherein the area discriminating section discriminates among the subject area, the background area, and the boundary area of the photographic image in accordance with one of the photographic images obtained by

15     the image obtaining section, and

       the background replacing section replaces a background of a photographic image, which is different from the photographic image used for discrimination of areas by the area discriminating section, of the photographic images

20     obtained by the image obtaining section.

           7.   A background replacing apparatus according to claim 1, wherein the mixing ratio determining section presumes the subject color and the mixing ratio in the

25     boundary area of the photographic image; and

       the background replacing section replaces the background of the photographic image with the different

background using the subject color and the mixing ratio, which are presumed by the mixing ratio determining section.

8. A background replacing apparatus according to claim 7, wherein the mixing ratio determining section presumes the subject color using colors in the subject area as candidates for the subject color.

9. A background replacing apparatus according to claim 7, wherein the mixing ratio determining section presumes the subject color and the mixing ratio on individual points in the boundary area, and presumes the subject color on assumption that the subject color lines up on a straight line basis with the background color and a color of the associated point in a predetermined color space.

10. A background replacing apparatus according to claim 7, wherein the mixing ratio determining section presumes the subject color and the mixing ratio on individual points in the boundary area, and presumes the subject color, using colors in the subject area as candidates for the subject color, in such a manner that of the candidates, a candidate, which lines up on a straight line basis with the background color and a color of the associated point in a predetermined color space, and is closest to the color of the associated point, is presumed

as the subject color.

11. A background replacing apparatus according to claim 7, wherein the mixing ratio determining section presumes the subject color and the mixing ratio on individual points in the boundary area, and presumes the mixing ratio in accordance with a ratio of a mutual distance among the background color, a color of the associated point, and the subject color, in a predetermined color space.

12. A background replacing apparatus according to claim 7, wherein the background replacing section replaces the background of the photographic image with the different background in such a manner that a color of the different background and the subject color presumed by the mixing ratio determining section are mixed at the mixing ratio presumed by the mixing ratio determining section.

13. A background replacing apparatus according to claim 1, wherein the background replacing apparatus further comprises an image correcting section performs correction of the area discriminated by the area discriminating section in response to an operation, and causes the background replacing section to perform the background replacing based on a corrected area so that a background replaced image is corrected.

14. A background replacing apparatus according to claim 13, wherein the area discriminating section discriminates the photographic image between a subject-side

5    area and a background-side area in accordance with a predetermined different point between the subject and the background in the photographic conditions, and the subject-side area and the background-side area are reduced by a predetermined reduction amount so as to be treated as the

10   subject area and the background area, and

the image correcting section alters the reduction amount on the area discriminating section in response to an operation, so that the subject area and/or the background area are corrected.

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15. A background replacing apparatus according to claim 13, wherein the area discriminating section discriminates between the subject area and the background area in accordance with a discrimination basis based on a

20   predetermined different point between the subject and the background in the photographic conditions, and

the image correcting section alters the discrimination basis in response to an operation, so that the subject area and/or the background area are corrected.

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16. A background replacing apparatus comprising: an image obtaining section that obtains a

plurality of photographic images generated through photography of a common subject under a plurality of photographic conditions;

an area discriminating section that discriminates a background area of the photographic image from other areas in accordance with at least one of the photographic images obtained by the image obtaining section;

a mixing state presuming section that presumes a mixing ratio of a subject color and a background color in other areas excepting the background area in the photographic image, and the subject color; and

a background replacing section that replaces a background of the photographic image obtained by the image obtaining section with a different background using the subject color and the mixing ratio, which are presumed by the mixing state presuming section.

17.  A background replacing apparatus according to claim 16, wherein the mixing state presuming section presumes the subject color using colors in the subject area as candidates for the subject color.

18.  A background replacing apparatus according to claim 16, wherein the mixing state presuming section presumes the subject color and the mixing ratio on individual points in other areas excepting the background area, and presumes the subject color on assumption that the

subject color lines up on a straight line basis with the background color and a color of the associated point in a predetermined color space.

5          19.   A background replacing apparatus according to claim 16, wherein the mixing state presuming section presumes the subject color and the mixing ratio on individual points in other areas excepting the background area, and presumes the subject color, using colors in other
10   areas excepting the background area as candidates for the subject color, in such a manner that of the candidates, a candidate, which lines up on a straight line basis with the background color and a color of the associated point in a predetermined color space, and is farthest from the color
15   of the associated point, is presumed as the subject color.

          20.   A background replacing apparatus according to claim 16, wherein the mixing state presuming section presumes the subject color and the mixing ratio on
20   individual points in other areas excepting the background area, and presumes the mixing ratio in accordance with a ratio of a mutual distance among the background color, a color of the associated point, and the subject color, in a predetermined color space.

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          21.   A background replacing apparatus according to claim 16, wherein the background replacing section replaces

the background of the photographic image with the different background in such a manner that a color of the different background and the subject color presumed by the mixing state presuming section are mixed at the mixing ratio

5    presumed by the mixing state presuming section.

    22.  A background replacing apparatus according to claim 16, wherein the area discriminating section discriminates a background area of the photographic image

10    from other areas in accordance with a ratio of luminous intensity among the plural photographic images.

    23.  A background replacing apparatus according to claim 16, further comprising a storage section that stores

15    the subject color and the mixing ratio, which are presumed by the mixing state presuming section,

    wherein the background replacing section replaces a background of the photographic image obtained by the image obtaining section with a different background using

20    the subject color and the mixing ratio, which are stored in the storage section.

    24.  A background replacing apparatus according to claim 16, further comprising a first parameter determining

25    section that determines a correction parameter to be used for a color correction for the subject color in accordance with an image of said other area in which a color is

replaced by the subject color presumed in the mixing state presuming section, and

a first color correcting section that applies the color correction to the subject color, which is presumed by the mixing state presuming section, using the correction parameter determined by the first parameter determining section,

wherein the background replacing section replaces the background of the photographic image obtained by the image obtaining section with a different background using the subject color subjected to the color correction by the first color correcting section and the mixing ratio.

25.    A background replacing apparatus according to claim 16, further comprising a second parameter determining section that determines a correction parameter to be used for a color correction for the subject color in accordance with the photographic image obtained by the image obtaining section, and

a second color correcting section that applies the color correction to the subject color, which is presumed by the mixing state presuming section, using the correction parameter determined by the second parameter determining section,

wherein the background replacing section replaces the background of the photographic image obtained by the image obtaining section with a different background using

168

the subject color subjected to the color correction by the second color correcting section and the mixing ratio.

26. A background replacing apparatus according to claim 16, further comprising a third parameter determining section that determines a correction parameter to be used for a color correction for the subject color to a parameter according to an operation, and

a third color correcting section that applies the color correction to the subject color, which is presumed by the mixing state presuming section, using the correction parameter determined by the third parameter determining section,

wherein the background replacing section replaces the background of the photographic image obtained by the image obtaining section with a different background using the subject color subjected to the color correction by the third color correcting section and the mixing ratio.

27. A background replacing apparatus according to claim 16, further comprising a fourth parameter determining section that determines a correction parameter to be used for a color correction for the subject color to a parameter according to the different background, and

a fourth color correcting section that applies the color correction to the subject color, which is presumed by the mixing state presuming section, using the correction

parameter determined by the fourth parameter determining
section,

wherein the background replacing section replaces
the background of the photographic image obtained by the
5    image obtaining section with the different background using
the subject color subjected to the color correction by the
fourth color correcting section and the mixing ratio.


28.  A background replacing apparatus according to
10   claim 16, wherein the background replacing section replaces
a background of the photographic image using, as the
different background, a background to which relation
information representative of a relative positional
relation in an image between the subject and the background
15   is applied, and performs an replacement in such a manner
that the relative relation in the background replaced image
between the subject and the background is the same relative
relation as the relative relation represented by the
relation information.

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29.  A background replacing apparatus comprising:
an image obtaining section that obtains a
plurality of photographic images generated through
photography of a common subject under a plurality of
25   photographic conditions mutually different in color of the
background;

an area discriminating section that discriminates

a background area of the photographic image from other areas in accordance with the photographic images obtained by the image obtaining section;

a mixing state presuming section that presumes a mixing ratio of the subject color to the background color, and the subject color, in other areas excepting the background area in the photographic image, in accordance with the plurality of photographic images; and

a background replacing section that replaces a background of the photographic image obtained by the image obtaining section with a different background using the subject color and the mixing ratio, which are presumed by the mixing state presuming section.

30. A background replacing apparatus according to claim 29, wherein the mixing state presuming section presumes, on assumption that the plurality of photographic images are equal to each other in terms of mixing state of the subject color and the background color, the subject color and the mixing ratio.

31. A background replacing apparatus according to claim 19, wherein the mixing state presuming section presumes the subject color and the mixing ratio on individual points in other area excepting the background area, determines straight lines each coupling in a predetermined color space the background color with a color

of the associated point in each of the plurality of
photographic images generated through photography of the
common subject under a plurality of photographic conditions
mutually different in color of the background, and presumes
a color corresponding to an intersection of the straight
lines as the subject color.

32. A background replacing apparatus according to
claim 29, wherein the image obtaining section obtains a
plurality of photographic images generated through
photography of the common subject under a plurality of
photographic conditions mutually different in color-phase
of the background.

33. A background replacing apparatus according to
claim 29, wherein the area discriminating section
discriminates between a subject area and a boundary area of
other areas excepting the background area in the
photographic image; and
the mixing state presuming section that presumes
the subject color and the mixing ratio in the boundary area.

34. A background replacing apparatus according to
claim 29, wherein the area discriminating section
discriminates the background area of the photographic image
obtained by the image obtaining section from other areas in
accordance with an amount of the change in color among the

172

plurality of photographic images.

35.   A background replacing apparatus according to claim 29, wherein the area discriminating section discriminates the background area of the photographic image obtained by the image obtaining section from other areas in accordance with a difference of luminous intensity between the background and the subject.

36.   A background replacing program that causes a computer to operate as an apparatus, when the background replacing program is incorporated into the computer and is executed, the apparatus comprising:

an image obtaining section that obtains a plurality of photographic images generated through photography of a common subject under a plurality of photographic conditions;

an area discriminating section that discriminates among a subject area, a background area, and a boundary area of the photographic image in accordance with the photographic images obtained by the image obtaining section;

a mixing ratio determining section that determines a mixing ratio of a subject color to a background color in the boundary area; and

a background replacing section that replaces a background of the photographic image obtained by the image

obtaining section with a different background in accordance with three areas of the subject area, the background area, and the boundary area, which are discriminated by the area discriminating section, and the mixing ratio determined by

5      the mixing ratio determining section.


37.    A background replacing program that causes a computer to operate as an apparatus, when the background replacing program is incorporated into the computer and is

10     executed, the apparatus comprising:

an image obtaining section that obtains a plurality of photographic images generated through photography of a common subject under a plurality of photographic conditions;

15     an area discriminating section that discriminates a background area of the photographic image from other areas in accordance with the photographic images obtained by the image obtaining section;

a mixing state presuming section that presumes a

20     mixing ratio of the subject color and the background color, and the subject color, in other areas excepting the background area in the photographic image; and

a background replacing section that replaces a background of the photographic image obtained by the image

25     obtaining section with a different background using the subject color and the mixing ratio, which are presumed by the mixing state presuming section.

38.  A background replacing program that causes a computer to operate as an apparatus, when the background replacing program is incorporated into the computer and is executed, the apparatus comprising:

an image obtaining section that obtains a plurality of photographic images generated through photography of a common subject under a plurality of photographic conditions in which colors of backgrounds are different from one another;

an area discriminating section that discriminates a background area of the photographic image from other areas in accordance with the photographic images obtained by the image obtaining section;

a mixing state presuming section that presumes a mixing ratio of the subject color and the background color, and the subject color, in other areas excepting the background area in the photographic image, in accordance with the plurality of photographic images; and

a background replacing section that replaces a background of the photographic image obtained by the image obtaining section with a different background using the subject color and the mixing ratio, which are presumed by the mixing state presuming section.

39.  A background replacing method comprising:

an image obtaining step that obtains a plurality

of photographic images generated through photography of a common subject under a plurality of photographic conditions;

an area discriminating step that discriminates
5   among a subject area, a background area, and a boundary area of the photographic image in accordance with the photographic images obtained by the image obtaining step;

a mixing ratio determining step that determines a mixing ratio of a subject color to a background color in
10  the boundary area; and

a background replacing step that replaces a background of the photographic image obtained by the image obtaining step with a different background in accordance with three areas of the subject area, the background area,
15  and the boundary area, which are discriminated by the area discriminating step, and the mixing ratio determined by the mixing ratio determining step.


40.   A background replacing method comprising:
20      an image obtaining step that obtains a plurality of photographic images generated through photography of a common subject under a plurality of photographic conditions;

an area discriminating step that discriminates a
25  background area of the photographic image from other areas in accordance with the photographic images obtained by the image obtaining step;

a mixing state presuming step that presumes a mixing ratio of a subject color and a background color, and the subject color, in other areas excepting the background area in the photographic image; and

5      a background replacing step that replaces a background of the photographic image obtained by the image obtaining step with a different background using the subject color and the mixing ratio, which are presumed by the mixing state presuming step.

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41.    A background replacing method comprising:

an image obtaining step that obtains a plurality of photographic images generated through photography of a common subject under a plurality of photographic

15    conditions;

an area discriminating step that distinguishes a background area of the photographic image from other areas in accordance with the photographic images obtained by the image obtaining step;

20      a mixing state presuming step that presumes a mixing ratio of a subject color and a background color, and the subject color, in other areas excepting the background area in the photographic image, in accordance with the plurality of photographic images; and

25      a background replacing step that replaces a background of the photographic image obtained by the image obtaining step with a different background using the

subject color and the mixing ratio, which are presumed by the mixing state presuming step.